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Wet Corn Gluten Feed Supplementation of Calves Grazing Corn Residue

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Feeding wet corn gluten feed to calves grazing cornstalks increases weight gain above non-fed controls. The optimum feeding level is 6.0 lb DM/head/day which can result in 1.8-1.9 lb/day gain.

Summary

Incremental levels of wet corn gluten feed were fed to calves grazing corn residues. Based on statistical and economical analysis of the data collected, feeding wet corn gluten feed (5.0-6.5 lb/head/day; DM basis) will increase stocking rate on corn residue and reduce winter costs by 11%. Given that 3.5 lb DM/day wet corn gluten feed will meet the protein and phosphorus needs of calves, and feeding above 6.0 lb/d will not increase gains, wet corn gluten feed should be fed at 3.5-6.0 lb DM/day, producing gains from 1.28-1.88 lb/day.

Introduction

Wet corn gluten feed has roughly the same energy value as corn (NEg = 0.64-0.68 Mcal/lb), is moderate in protein (23% CP) and phosphorus (0.95%), is palatable, and is safe to feed in terms of little or no risk of acidosis or founder. With the high concentration of nutrients discussed, WCGF supplies several expensive nutrients in one package. Feeding five lb of WCGF (DM/head/day) is sufficient to meet the metabolizable protein requirement of calves grazing corn residues. However, no animal performance trials have been conducted to specifically determine the optimum feeding level of WCGF to calves grazing corn residues.

The objective of our study was to evaluate calf growth response to incremental levels of wet corn gluten feed supplemented on corn residues in the late fall and early winter.

Procedure

A steer growth trial was conducted from Oct. 27, 1999 through Jan. 13, 2000 using thirty-seven crossbred steer calves (552 lb) which were individually fed a supplement while grazing corn residues. Steers were assigned randomly to one of seven levels of supplement (2.0, 2.75, 3.5, 4.25, 5.0, 5.75, and 6.5 lb of DM/head/day). The control treatment (7 head) consisted of a sunflower meal-

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based supplement fed at 2 lb/head/day (DM basis) that was formulated to meet the degradable intake protein (DIP) requirement of the steers. The second treatment (5 head) was a combination of WCGF (68%) and sunflower meal (32%) fed at 2.75 lb DM/head/day. Sunflower meal was required in the second treatment to meet DIP requirement of the steers. The remaining 5 treatments (5 head/treatment) consisted entirely of WCGF (3.5, 4.25, 5.0, 5.75, and 6.5 lb/head/day; DM basis). All steers were individually fed the appropriate amount of supplement once daily using Calan electronic gates. Each morning at approximately 6:30, steers were gathered for feeding. Steers were allowed a maximum of one hour to consume the respective supplement offered. Following feeding, steers were returned to the cornstalk field. Four 7.4 acre fields were allocated for grazing. Steers were allowed access to a new paddock when visual appraisal indicated that leaf and husk material was limiting.

Initial and final weights were the average of three consecutive-day weights following three days of limit feeding a common diet containing 50% wet corn gluten feed and 50% alfalfa hay fed at 2% of body weight (DM basis).

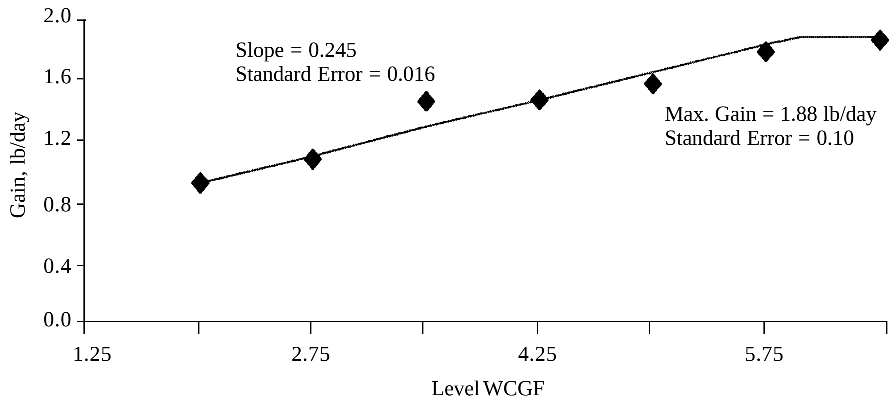

Figure 1. Daily gain of steers supplemented with wet corn gluten feed on cornstalks.

Table 1. Supplement effects on cornstalk intake predicted by two methods.

Supplement Intake[a]	NRC Computer Model[a]	Stalk Intake Equation[ab]
2.00	10.4	9.8
2.75	10.2	10.2
3.50	10.1	10.2
4.25	9.3	10.1
5.00	8.5	9.7
5.75	8.6	9.8
6.50	8.6	9.7

[a]Values expressed as DM lb/head/day.
[b]Equation: $RI = (0.0365W^{0.75} - SD(SI))/1-RD$, where RI = Residue Intake, SD = Supplement Digestibility, SI = Supplement Intake, and RD = Residue Digestibility.

Results

Steers on the control treatment gained 0.91 lb/day. Average daily gain increased up to 1.86 lb/day as WCGF was included at the 6.5 lb DM/head/day level. When a non-linear statistical analysis was applied to the data, it predicted that gains leveled off at 6.0 lb DM (Figure 1). The analysis suggests feeding WCGF above 6.0 lb DM/day would not increase gains and presumably, the cattle would begin to replace stalk intake with WCGF. Over the past four years, research conducted at the University of Nebraska has used 5.0 lb/head/day (DM basis) of WCGF to increase winter gains (2001 Nebraska Beef Cattle Report, pp. 29-34). Based on the previous research, feeding WCGF in the winter will reduce slaughter breakeven compared to feeding a protein supplement similar to the control treatment in the present study. The reduction in slaughter breakeven has been attributed to increased winter weight gain which is maintained throughout summer grazing and finishing, resulting in more sale weight. Therefore, feeding 6.0 lb DM/head/day of WCGF might increase winter weight gain and should further reduce slaughter breakevens compared to feeding 5.0 lb DM/head/day.

Feeding WCGF to calves grazing corn residues should increase the carrying capacity of the cornstalks. Estimates of cornstalk intake were determined from two sources: the 1996 Nutrient Requirements of Beef Cattle computer model and an equation developed specifically to predict corn residue intake from residue digestibility and fecal output (1989 Journal of Animal Science, pp. 581-589). Table 1 shows the intake predictions based on each model. In order to predict stalk intake from the 1996 NRC computer model, net energy adjustments were made based on another article contained within this report (2001 Nebraska Beef Cattle Report, pp. 116-119). Cornstalk intake was first predicted based on the stalk prediction equation for each level of supplementation. Once a stalk intake was established, it was used to determine the TDN concentration of the total diet and a net energy adjustment was calculated and applied to the 1996 NRC computer model. The 1996 NRC computer model then was used to predict stalk intake to determine how comparable the values were between the two sources. Table 1 shows the stalk intake predicted by the 1996 NRC computer model. While the predicted intakes do not always agree, especially at higher supplement intakes, true values should fall within the range of the two intake predictions at a given level of supplementation. Therefore, higher levels of WCGF (5.0-6.5 lb/head/day DM) reduced cornstalk intake by 10%, from about 10.1 lb/head/day (DM basis) with low level supplementation to 9.1 lb/head/day (DM basis). Economic analysis of winter supplementation of WCGF (2001

Nebraska Beef Cattle Report, pp. 29-34) indicates that extending stalk grazing by 10% would reduce wintering costs and increase profit/head by $1.00. Without taking the calves completely through a growing/finishing system, it is not possible to determine the optimum level of WCGF supplementation on corn residue. However, these data indicate what gains might be expected with different levels of WCGF supplementation. About 3.5 lb DM/day is needed to meet the protein and phosphorus requirements of the calves. Therefore, it is logical to feed at least that amount. Based on the non-linear analysis, it seems that 6.0 lb DM/day is a logical upper limit. This range of feeding should result in gains ranging from 1.28-1.88 lb/day. Producers may then select a level of WCGF based on desired daily gain, stalk availability, cattle frame and weight (as it affects market weight), and length of summer grazing season.

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